STAN-EVAL NOTES
CIVIL AIR PATROL VIRGINIA WING
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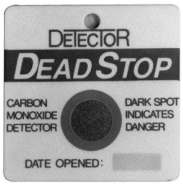
The Importance of Keeping CO Detectors Current (LtCol G. Jackson, Maj M. Wormington): The December 2012 issue of our Stan Eval newsletter noted in the "Winter is Coming" article the risks associated with CO poisoning. CO poisoning occurs when CO gas which is colorless and odorless leaks into the cabin usually because of a leak in the exhaust system combined with the heater being turned on. CO is a killer and has been the cause of many aviation accidents. AOPA has an excellent article by Mike Busch which can be viewed here. VAWG recently experienced a CO leak in N99559 which was detected by the CO detector in the cabin and subsequently noted by the pilot who immediately had the exhaust system inspected by an A&P.

Here is the crack in the exhaust pipe:

And here is what the CO detector looked like (note that it's completely dark):



What that detector tells us is that CO was in the cabin and posed an immediate danger to the crew. Fortunately, the pilot detected this as soon as the detector went dark and repairs were made.

New CO detectors were issued to all aircraft custodians at the last Commander's Call. Custodians should ensure that they have been installed.

All pilots and crew need to do the following:

- Check the detector during the preflight and note both its expiration date (need to make sure it's current) and ensure it does not indicate CO poisoning. If the CO detector has expired, notify your MX officer immediately.
- Check as much of the exhaust system as possible during pre flight without removing the cowl to check any leaks. Check for evidence of soot around joints in particular.
- Monitor the detector as you would any other instrument during the flight. If the detector turns dark, open a window, turn off the heat, and get on the ground when practical where you can have an A&P do a physical inspection of the exhaust system.
- Don't wait for the detector to tell you if something is wrong. If you or your crew begins to feel nauseous, have a headache, or any other symptom of CO poisoning, open a window, turn off the heat, and land when practical.
- Check the detector as part of your post flight to ensure it is still clear.

Twelve Items that an IFR pilot must know how to do (Capt J. Karanikas): What is expected of IFR pilots filing /G on their flight plan? The following is directly from the AIM, and details 12 items, at a minimum, that the pilot must be able to accomplish in the IFR system (see GPS familiarization AIM 1-1-19):

"Pilots should practice GPS approaches under visual meteorological conditions (VMC) until thoroughly proficient with all aspects of their equipment (receiver and installation) prior to attempting flight by IFR in instrument meteorological conditions (IMC). Some of the areas which the pilot should practice are:

1. Utilizing the receiver autonomous integrity monitoring (RAIM) prediction function;
2. Inserting a DP into the flight plan, including setting terminal CDI sensitivity, if required, and the conditions under which terminal RAIM is available for departure (some receivers are not DP or STAR capable);
3. Programming the destination airport;
4. Programming and flying the overlay approaches (especially procedure turns and arcs);
5. Changing to another approach after selecting an approach;
6. Programming and flying "direct" missed approaches;
7. Programming and flying "routed" missed approaches;
8. Entering, flying, and exiting holding patterns, particularly on overlay approaches with a second waypoint in the holding pattern;
9. Programming and flying a "route" from a holding pattern;
10. Programming and flying an approach with radar vectors to the intermediate segment;
11. Indication of the actions required for RAIM failure both before and after the FAWP; and
12. Programming a radial and distance from a VOR (often used in departure instructions)."

GPS Failures during an instrument approach (Capt J. Karanikas): Many pilots have grown so dependent on GPS, that they have become "Children of the Magenta Line". It makes flying so easy and situational awareness so great that we tend to rely on it exclusively for navigation. But what happens when the GPS fails to provide course guidance? The failure can be from anything as simple as not programming the GPS correctly, a GPS receiver equipment failure, or a system wide GPS outage. In any case, we as pilots must be prepared to safely fly the aircraft while going to "plan B".

VAWG GPS equipment does fail as in flight as shown above of an actual GX 60 GPS receiver failure in N9983H demonstrates: So what can pilots do to mitigate any issues that may arise with a GPS failure?

First we must always maintain situational awareness and know where we are at, where we are going next, and how we are going to get there. Even with the most sophisticated equipment, the pilot should still know Time/Speed/Distance to the next waypoint. Don't become complacent with GPS, employ all navigation instruments onboard the aircraft at all times. The FAA finds this important enough to include the following guidance in the "Instrument Flying Handbook", which is in reference to GPS Approaches "While conducting these IAPs, ground-based NAVAIDs are not required to be operational and associated aircraft avionics need not be installed, operational, turned on, or monitored; however, monitoring backup navigation systems is always recommended when available."

So when will a pilot need to utilize ground based components? Consider flying the RNAV 32 into OKV. If the GPS receiver does not switch to approach mode by the time the aircraft crosses COGAN (the final approach waypoint (FAWP)), the pilot must execute the missed approach. The following is from the AIM 1-1-19, Global Positioning System (GPS) "4. If the receiver does not sequence into the approach mode or a RAIM failure/status annunciation occurs prior to the FAWP, the pilot should not descend to Minimum Descent Altitude (MDA), but should proceed to the missed approach waypoint (MAWP) via the FAWP, perform a missed approach, and contact ATC as soon as practical."

Similar guidance for a receiver failure AFTER the FAWP: "If a RAIM failure occurs after the FAWP, the receiver is allowed to continue operating without an annunciation for up to 5 minutes to allow completion of the approach (see receiver operating manual). If the RAIM flag/status annunciation appears after the FAWP, the missed approach should be executed immediately."

In either case, the pilot can sort out the anomaly out AFTER successfully flying the missed approach, but without any back up navigation already tuned/identified and "Plan B" well thought out, the pilot may have a tough time making it back to CLADD for the hold without radar vectors. What if the pilot had the localizer tuned/identified in NAV 1, and a cross radial to identify CLADD already in NAV 2? The pilot could intercept and track the localizer outbound to CLADD without issue.

The bottom line is, use all of the aircraft's navigational equipment, even if it is not required for the particular approach you are flying, and always have "Plan B" well thought out!

Aircraft Icing (Capt John Karanikas): Winter is upon us, and with it brings the possibility of icing conditions. As a general rule, CAP is NOT a first responder, so we do not launch air crews into known icing conditions.

First let's review a few facts:

- VAWG's aircraft are NOT certified for flight into known icing conditions.
- No aircraft should launch into flight without perfectly clean airfoils
- 64% of the total weather accidents are in fixed gear single engine aircraft
- 40% of the accidents are from Structural Icing
- 52% of the accidents are from Induction Icing
- 8% of the accidents are from ground accumulation (failure to clean airfoils)
- Standard atmospheric lapse rate is approx. 3.5 F or 2 C degrees per thousand feet of altitude. Taking the example of 42F degrees on the ground, the aircraft will be in freezing conditions at 3000 feet
- Don't fall into the trap of filing the Minimum Route Altitude (MEA) with the expectation that this will keep you out of the clouds. ATC will move aircraft to any altitude that is required for safe separation of traffic. This may put you into the clouds…exactly where you don't want to be.

So with IFR flight into known icing conditions out of the picture for CAP aircraft, let's explore VFR winter flying options. We can fly VFR as long as we stay clear of clouds and freezing rain and/or drizzle are not a factor. Please be aware, based on the moisture content of the atmosphere, carburetor icing may still be a possibility.

But before taking off we need to explore other items that may cause issues with winter VFR flying. VAWG does a good job in protecting our aircraft when a storm is approaching, but there may be times when aircraft are left outdoors in snow and icing conditions. One of the dangers is that the added weight of snow/ice on the tail of the aircraft may cause it to impact the ground while tied down. If the control lock is properly installed the tail tie down ring will touch the ground before the elevator does, eliminating damage to the elevator if there is no significant ice or snow accumulation below it. The other issue is that damage may occur, and after the snow/ice melts the aircraft will return to a level tie down position. If a careful preflight is not accomplished, the pilot may not notice the damage as shown in the following photos:

Other issues to be aware of are:

- Snow and ice on the ramp, this not only causes issues for aircraft movement, but also to CAP personnel on the ramp

- Be extremely careful when climbing around the aircraft to check fuel, oil, brush snow off, etc. The potential for a slip/fall is huge during winter weather.

- The drive to from the airport may be in icy conditions

- If snow accumulates on an aircraft, brush it off as early as possible to allow the sun to complete the job. Removing snow as soon as it accumulates increases the probability that you'll have clean surfaces the day of the flight.

For further information, please use the following link: http://www.aopa.org/asf/publications/sa11.pdf

Check ride statistics for VAWG: The statistics for check rides for VAWG during the period July – December 2012 are now available. VAWG completed 92 check rides during this period which is an impressive number. Thanks to the dedicated efforts of our check pilots, instructor pilots and pilots, we have a strong track record. Let's improve on this record for the next six month period.

Check Rides	VAWG Trend Sum of Passed	Sum of Failed
Form 5	77	4
Form 91	15	0
Grand Total	**92**	**4**

Taking Off and Landing with a Tailwind: Taking off or landing with a tail wind is usually a bad idea but can be necessary in some very specific instances. Traffic, runway slope, ATC, or terrain are a few considerations that might invite a tail wind operation. A recent article in "Flying Lessons Weekly" provides some rules of thumb for tail wind takeoffs and landings that might surprise pilots but are good rules of thumb to follow.

"Most Pilot's Operating Handbooks (POHs) will carry at least some caution or warning about tailwind takeoffs and landings. Combine the recommendations of a few and you can derive some good rules of thumb about tailwind takeoffs and landings, to decide if it's worth the risk.

For example, the Cessna 172S POH gives some fairly precise guidance on the relative effects of a tailwind versus the "conventional" headwind takeoff. Note 3 from the Takeoff Distance performance chart tells us that we should decrease the takeoff distance we derive from using the chart by 10% for every nine knots of headwind. But it also tells us to increase takeoff distance by 10% for every two knots of tailwind component.

Put another way, a tailwind component has almost five times the performance effect as a comparable headwind component. If we normally take off into the wind to improve takeoff performance, we really want to avoid taking off with a tailwind because the performance will be significantly impaired.

Cessna gives us similar guidance for landings with a tailwind. The Landing Distance chart contains a similar nearly five-to-one difference between landing distance improvement with a headwind component and increased landing distance with a tailwind."

"We can begin to develop some rules of thumb:

- Each knot of headwind component on takeoff improves takeoff performance by roughly one percent, while each knot of tailwind component degrades performance by three to five percent. Tailwinds are three to five times as detrimental to takeoff as headwinds are an improvement.
- While each one knot of headwind component improves landing performance by about one percent, each knot of tailwind component degrades landing distance by about three to five percent. Tailwinds are roughly three to five times as effective at altering landing performance thank headwinds…and the alteration is not in your favor.
- In almost all cases, then, there is very good reason for avoiding tailwind takeoffs and landings, even if it makes more sense for the direction of flight on departure or arrival."

Researchers Develop New Ground-Based Indoor GPS (SME Daily Exec Briefing): Popular Science (1/4, Dillow) reports that "a new ground-based positioning system called Locata could soon replace or augment

satnav using radio signals that are a million times stronger than GPS signals, indoors or out. There have been copious attempts at providing indoor location services by dozens if not hundreds of companies, but nothing has yet proven effective enough to be rolled out on a commercial scale."

The UK's New Scientist (1/4, Hambling) reports, "Instead of satellites, Locata uses ground-based equipment to project a radio signal over a localised area that is a million times stronger on arrival than GPS. It can work indoors as well as out, and the makers claim the receivers can be shrunk to fit inside a regular cellphone. Even the US military, which invented GPS technology, signed a contract last month agreeing to a large-scale test of Locata at the White Sands Missile Range in New Mexico."

Turn on Those Approach Lights!!! (Col R. Moseley): Pilots may forget the importance of approach lighting systems on instrument approaches but they are a vital part of an approach system. In the AIM, we find the ILS system described as three components: the localizer, the glide slope, and the approach lights. The published minimums are based on the approach lights being in operation. If they are not, then you must fly to higher minimums as described in the inoperative table found at the front of the TERPS (or as modified by any notes on the particular approach plate). When flying into a controlled airport, the lights are controlled by the tower. But in non towered airports, it's the pilot's responsibility to turn the approach lighting system on usually by several clicks on the CTAF (but not always, so check your AFD). Turning on the approach lights is not just for ILS approaches but any approach including a non precision approach. Having the lights on improves the probability that you will be able to complete the approach and gives you the lowest possible minimums.

A recent accident at involved an aircraft performing a go around after a missed approach in low IFR at Stafford Airport (RMN). Although the NTSB could not verify that the pilot had failed to turn on the approach lights, there was some evidence from local observers that this was the case and contributed to conditions necessitating a go around that was poorly executed and resulted in a crash and fatalities.

Many of us do practice instrument approaches under the hood with a safety pilot in VFR conditions. That's a great thing but can make us forget to turn on the lights as part of our approach (who needs lights in day VFR, right?). By not practicing turning on the lights, we are setting a habit and pattern that could bite us on a real approach where not turning on the lights may force a go around, or worse still, flying to minimums not authorized when the lighting system is not on. So anytime you do an approach, be it practice or for real, turn on the lights as part of your final approach check list.

VAWG IPs and Check Pilots should make sure every VAWG pilot understands the importance of turning on the lights for any approach and how to adjust minimums when the lights don't work.

Articles for the VAWG Stan Eval Newsletter: We are always looking for brief articles of interest to VAWG pilots to include in this newsletter. CAP has many very experienced pilots and aircrew who have useful techniques, experiences, and tips to share. Please send your contribution to steve.hertz@ngc.com. If your article is accepted, you will get a pro rata share of the VAWG Stan Eval Newsletter subscription fees.